

CLAIMS

1. A dip-forming composition comprising a conjugated diene rubber latex prepared by copolymerizing, based on the weight of total monomers, 30 to 90% by weight of a conjugated diene monomer, 0.1 to 20% by weight of an ethylenically unsaturated acid monomer and 0 to 69.9% by weight of other ethylenically unsaturated monomer copolymerizable therewith, wherein a copolymer constituting the conjugated diene rubber latex exhibits a content insoluble in methyl ethyl ketone of not larger than 30% by weight at a latex pH value of 10, and the dip-forming composition has a pH value of at least 8.5 and is substantially free from a sulfur-containing vulcanizer, a vulcanization accelerator for the sulfur-containing vulcanizer, and zinc oxide.

2. The dip-forming composition according to claim 1, wherein the conjugated diene rubber latex is prepared by copolymerizing, based on the weight of total monomers, 40 to 85% by weight of a conjugated diene monomer, 1 to 15% by weight of an ethylenically unsaturated acid monomer and 0 to 59% by weight of other ethylenically unsaturated monomer copolymerizable therewith.

3. The dip-forming composition according to claim 1 or 2, wherein the conjugated diene monomer is at least one kind of monomer selected from the group consisting of 1,3-butadiene and isoprene.

4. The dip-forming composition according to any one of claims 1 to 3, wherein the ethylenically unsaturated acid monomer is at least one kind of monomer selected from the group consisting of ethylenically unsaturated monocarboxylic acid monomers, ethylenically unsaturated polycarboxylic acid monomers, ethylenically unsaturated polycarboxylic acid anhydride monomers, ethylenically unsaturated sulfonic acid monomers and ethylenically unsaturated polycarboxylic acid partial ester monomers, and metal salts and ammonium salts of these monomers.

5. The dip-forming composition according to any one of

claims 1 to 3, wherein the ethylenically unsaturated acid monomer is an ethylenically unsaturated carboxylic acid monomer.

6. The dip-forming composition according to any one of claims 1 to 3, wherein the ethylenically unsaturated acid monomer is an ethylenically unsaturated monocarboxylic acid monomer.

7. The dip-forming composition according to any one of claims 1 to 6, wherein the other ethylenically unsaturated monomer is an ethylenically unsaturated nitrile monomer.

8. The dip-forming composition according to claim 1, wherein the conjugated diene rubber latex is prepared by copolymerizing, based on the weight of total monomers, 40 to 79% by weight of butadiene, 1 to 15% by weight of methacrylic acid and 20 to 45% by weight of acrylonitrile.

9. The dip-forming composition according to any one of claims 1 to 8, wherein the copolymer constituting the conjugated diene rubber latex exhibits a content insoluble in methyl ethyl ketone of not larger than 20% by weight at a latex pH value of 10.

10. The dip-forming composition according to any one of claims 1 to 9, wherein the conjugated diene rubber latex is prepared by an emulsion copolymerization procedure using 0.1 to 5 parts by weight of a molecular weight modifier based on 100 parts by weight of the total monomers.

11. The dip-forming composition according to claim 10, wherein the emulsion copolymerization procedure is carried out by a process wherein a part of the molecular weight modifier is added into a polymerization system before commencement of polymerization, and the remainder of the molecular weight modifier is added to the polymerization system after commencement of polymerization.

12. The dip-forming composition according to claim 11, wherein 40 to 95% by weight of the molecular weight modifier, based on the total weight thereof used, is added into a polymerization system before commencement of polymerization, and the remainder of the molecular weight modifier is added to the polymerization system when the polymerization conversion

within the polymerization system is in the range of 50 to 95%.

13. The dip-forming composition according to any one of claims 1 to 12, which has a pH value in the range of 9.5 to 13.

14. The dip-forming composition according to any one of claims 1 to 13, wherein the contents of the sulfur-containing vulcanizer, the vulcanization accelerator for the sulfur-containing vulcanizer, and zinc oxide in the dip-forming composition are in the ranges of, based on 100 parts by weight of the solid content of the conjugated diene rubber latex, 0 to 0.4 part by weight, 0 to 0.4 part by weight and 0 to 0.7 part by weight, respectively.

15. The dip-forming composition according to any one of claims 1 to 14, which has a total solid content in the range of 5 to 50% by weight, based on the weight of the composition.

16. A dip-formed article made from the dip-forming composition as claimed in any one of claims 1 to 15, which article has been crosslinked with a water-soluble polyvalent metal salt used as a coagulant for latex, and has been prepared without substantial use of a sulfur-containing vulcanizer, a vulcanization accelerator for the sulfur-containing vulcanizer, and zinc oxide.

17. The dip-formed article according to claim 16, wherein the water-soluble polyvalent metal salt has a solubility in water at 25°C of at least 5 parts by weight per 100 parts by weight of water, and is a salt of a metal selected from the group consisting of the metals in group 2, group 12 and group 13 of the periodic table.

18. The dip-formed article according to claim 16 or 17, which has a tensile stress of smaller than 3.5 MPa at 300% elongation, and a tensile strength of at least 10 MPa.

19. A process for making a dip-formed article comprising the steps of:

(1) forming a dip-formed layer on a dip-forming form from the dip-forming composition as claimed in any one of claims 1 to 15 by carrying out (i) at least one step of dipping a dip-forming form in a liquid containing a water-soluble

polyvalent metal salt as a coagulant for latex, to form a layer comprised of the coagulant-containing liquid on the form, and then, dipping the form having the coagulant-containing liquid thereon in said dip-forming composition; or (ii) at least one step of dipping a dip-forming form in said dip-forming composition to form a layer of the dip-forming composition on the form, and then, dipping the form having the layer of the dip-forming composition thereon in a liquid containing a water-soluble polyvalent metal salt as a coagulant for latex; or (iii) a combination of said step (i) with said step (ii);

(2) drying the dip-formed layer formed on the form; and then,

(3) releasing the dried dip-formed layer from the form.

20. The process for making a dip-formed article according to claim 19, wherein the step (1) of forming a dip-formed layer on the dip-forming form is carried out at a temperature in the range of room temperature to 90°C, and the step (2) of drying the dip-formed layer is carried out at a temperature in the range of 60 to 95°C.

21. The process for making a dip-formed article according to claim 19 or 20, wherein the dip-formed layer of said dip-forming composition is formed on a dip-forming form by carrying out at least one step (i) of dipping the dip-forming form in a liquid containing a water-soluble polyvalent metal salt as a coagulant for latex, to form a layer comprised of the coagulant-containing liquid on the form, and then, dipping the form having the coagulant-containing liquid thereon in said dip-forming composition.